



Reliability and Maintainability (R&M) Engineering Update

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Purpose/Outline

PURPOSE

- **Provide an update of DoD R&M Engineering Activities and Initiatives**

OUTLINE

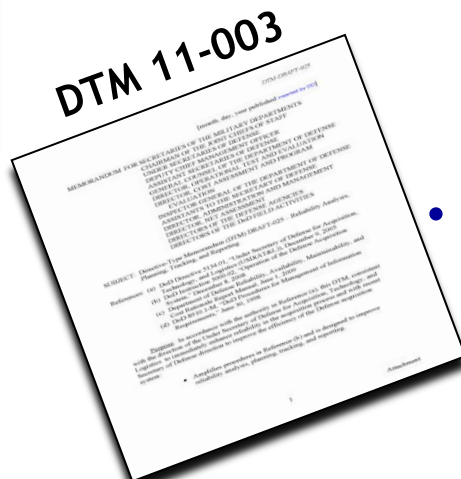
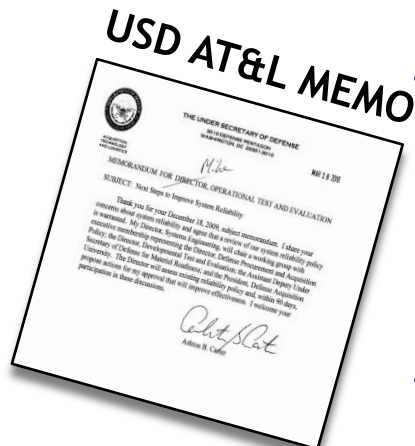
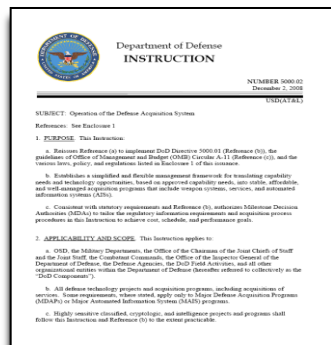
- **Policy**
- **Guidance and Standardization**
- **Workforce Development**
- **Summary**



Policy

Reliability Analysis, Planning, Tracking and Reporting

DoDI 5000.02



- **Impetus for Reliability Policy**
 - Directed by Dr. Carter in response to memo from DOT&E
 - DASD(SE) to assess existing reliability policy and propose actions to improve effectiveness
- **DoD Acquisition Policy (DoDI 5000.02)**
 - Does not adequately or uniformly consider R&M engineering activities throughout the acquisition process
 - Fails to capture R&M planning in new or existing acquisition artifacts to inform acquisition decision making
- **DTM 11-003 (Approved 21 Mar 2011)**
 - Amplifies current DoDI 5000.02 by requiring PMs to perform reliability activities
 - Institutionalizes planning and reporting timed to key acquisition activities

<http://www.dtic.mil/whs/directives/corres/pdf/DTM-11-003.pdf>



Policy

DTM 11-003 Key Policy Attributes

- **Mandates specific reliability planning in the SEP and TEMP:**
 - Submission of a RAM-Cost Rationale Report (SEP)
 - Comprehensive R&M planning (SEP)
 - Reliability Growth Curves (SEP and TEMP)
- **Mandates identification of reliability contract requirements in the TDS and AS:**
 - Translation of AoA sustainment characteristics and Sustainment KPP thresholds into R&M design requirements and contract specifications
 - Identification of systematic processes that the contractor will be required to use to demonstrate achievement of these design requirements
- **Directs PMs and OTAs to assess the likelihood of reliability requirement achievement during IOTE and report this to the MDA at MS C**
- **Establishes specific reliability monitoring and reporting throughout the acquisition process as part of established technical reviews and assessments and in the DAES**



Policy

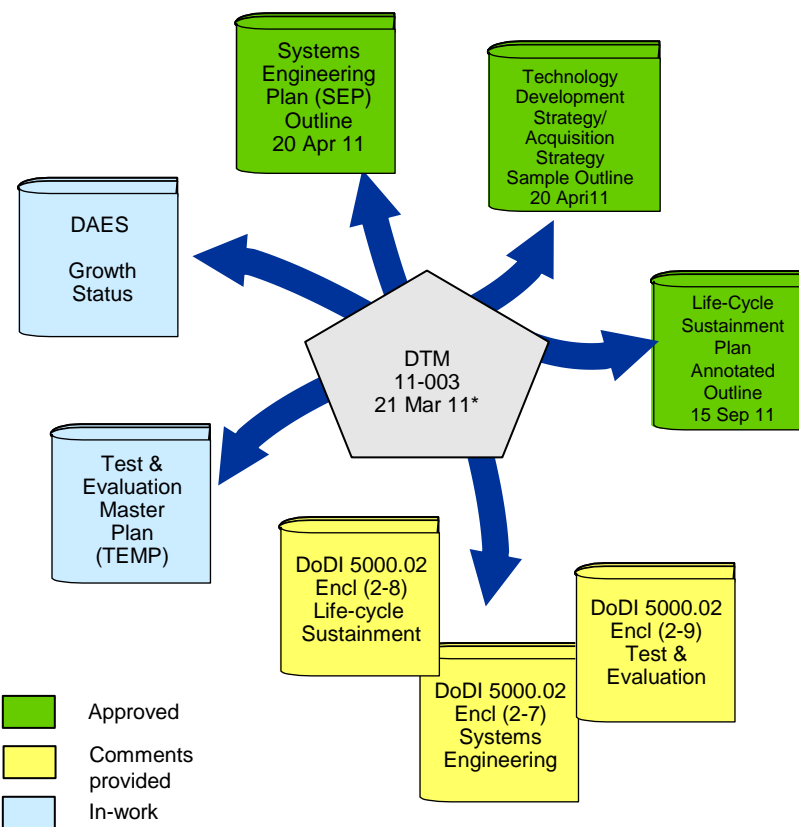
Relationship to DoD Documents



- **Integrating DTM-required engineering activities into DoD Policy**

- Approved Outlines
 - Systems Engineering Plan
 - Technology Development Strategy and Acquisition Strategy
 - Life Cycle Sustainment Plan
- Comments provided
 - DoDI 5000.02, Encl 2-9 (T&E)
 - DoDI 5000.02, Encl 2-7 (SE)
 - DoDI 5000.02, Encl 2-8 (LCS)
- In-Work
 - DAES Growth Status
 - TEMP – DDT&E evaluating format

DTM Relationship to DoD Policy Documents



Status:

Green	Approved
Yellow	Comments provided
Blue	In-work

* Extended to 31 Dec 2012



Guidance and Standardization



- **Defense Acquisition Guidance (DAG)**

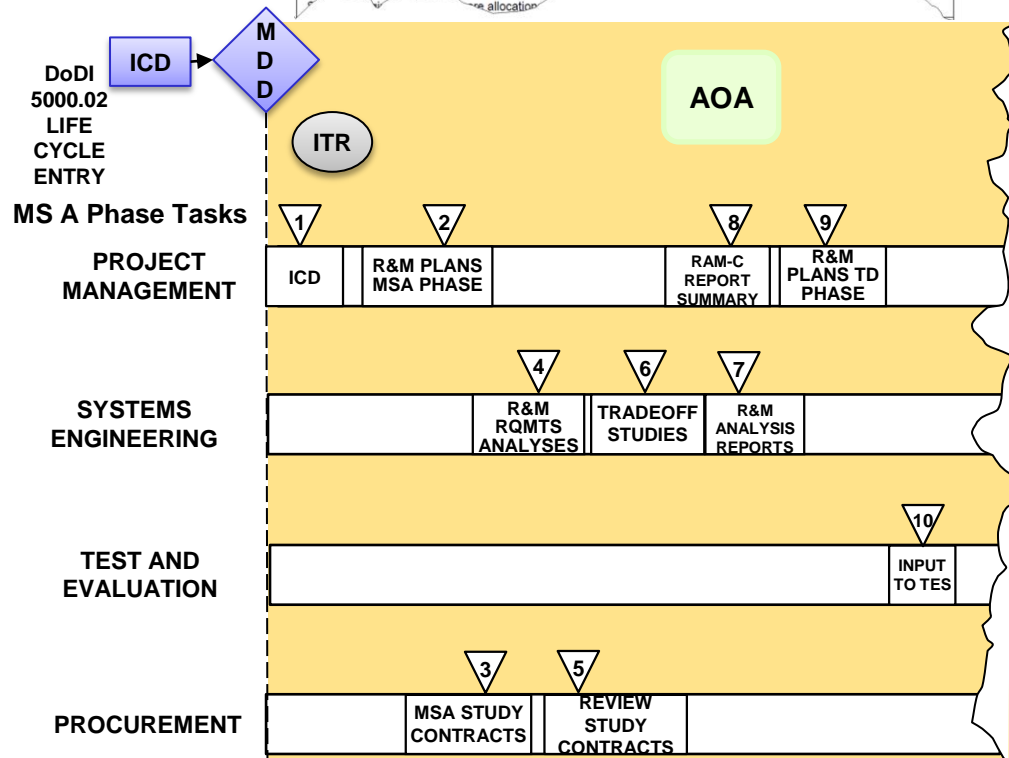
- DAG Chapter 4, paragraph 4.4.15 updated for “fact of life” changes

- **Lower Level Implementation Guidance**

- Developing R&M engineering guidance by phase and by program functional areas
 - Services reviewed and commented on MSA and TD phases
 - Services reviewing the EMD phase

Table 1. DTM 11-003 Required R&M Engineering Activities by Functional Area

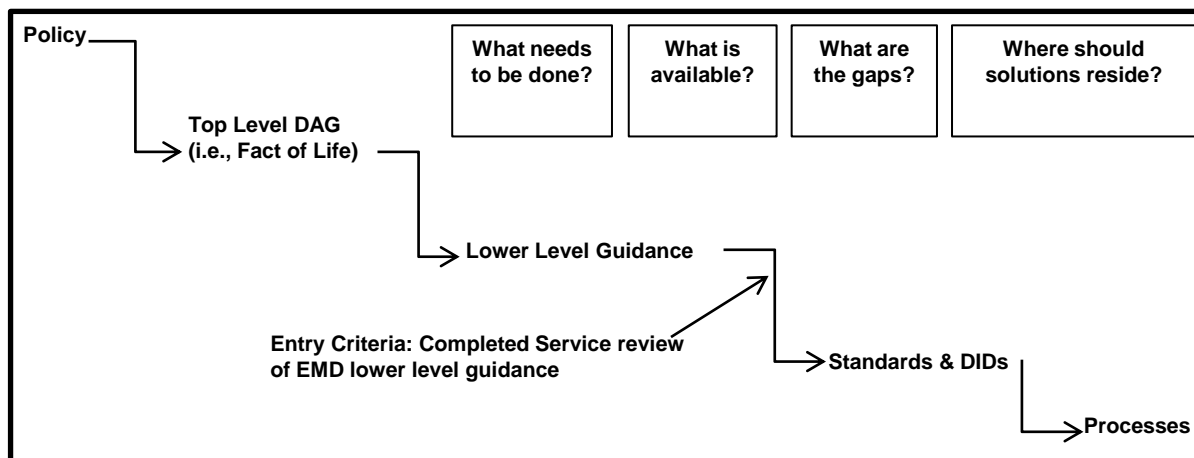
Functional Area	DTM 11-003-Required R&M Engineering Activities	MSA	TD	E&MD	P&D	O&S
Project Management	Formulate a comprehensive R&M program using appropriate reliability growth strategy	•	•	•	•	•
Project Management	Integrate R&M Engineering Program in Systems Engineering Plan (SEP) including a system reliability growth curve	•	•	•		
Project Management	Prepare/Update RAM-C Report and attach to the SEP	•	•	•		
Project Management	Report reliability status during formal design review process and technical reviews (SRR, PDR, CDR, etc.)	•	•	•		
Project Management	Prepare reliability growth assessment of the likelihood of meeting the CDD threshold by IOT&E			•		
Project Management	Evaluate reliability growth and report status in DAES reviews until the threshold is achieved			•		





Guidance and Standardization

- **Developed contracting language that considers program type and phase for cost-effective application of R&M engineering activities**
 - Service review synchronized with EMD phase
 - Entrance criteria for standardization working group
- **R&M Standards working group**
 - Priority will be given to standards that directly relate to R&M engineering activities required by the DTM
 - Contracting language will define the standardization activity to contract for R&M





Workforce Development

Key Terms



- **Competency:** OPM definition “.... an observable, measurable pattern of skills, knowledge, abilities, behaviors & other characteristics that an individual needs to perform work roles or occupational functions successfully.

Example: “Employ the systems engineering processes to conduct and evaluate an Analysis of Alternatives for the selected concept from an systems engineering perspective.”

- **Sub-Competency:** the decomposition of a competency into its more detailed set of skills, knowledge and abilities.

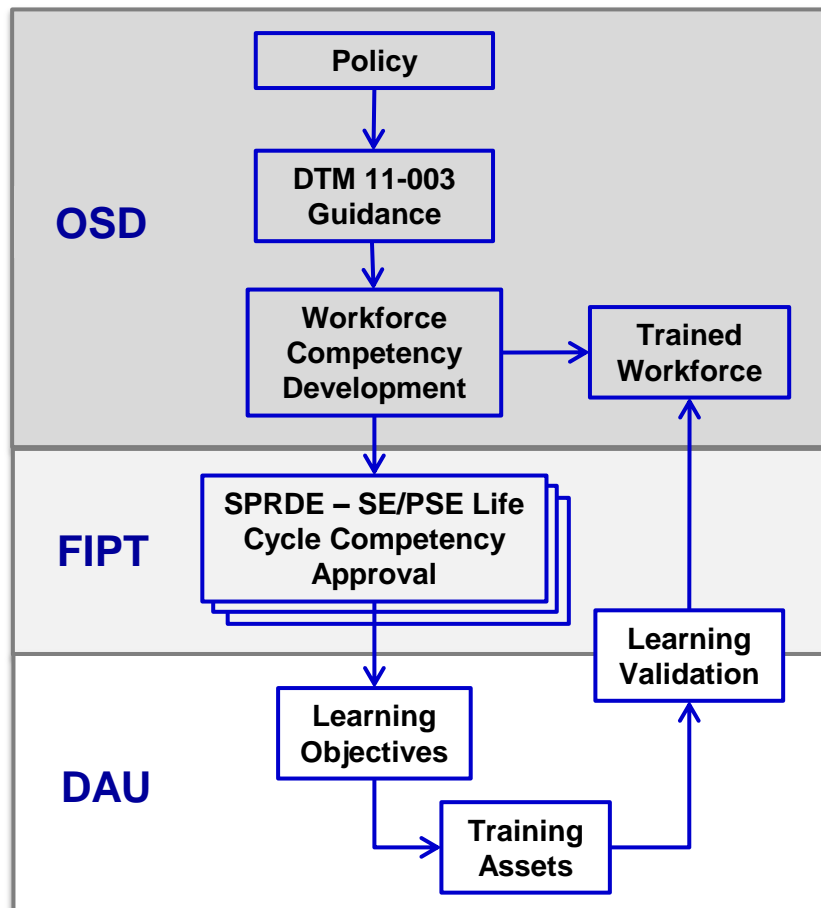
Example: “Develop an analysis of alternatives employing identification and analysis of alternatives, measures of effectiveness, cost, schedule, concepts of operations, and overall risk, including the sensitivity of each alternative to possible changes in key assumptions or variables.”

- **Learning Objective:** clearly states the measurable performance the learner will be able to demonstrate at the conclusion of training, including conditions, and criteria of performance.

Example: “Explain the components of an Analysis of Alternatives (AoA) and identify the characteristics of a complete and well written AoA.”



Workforce Development Approach

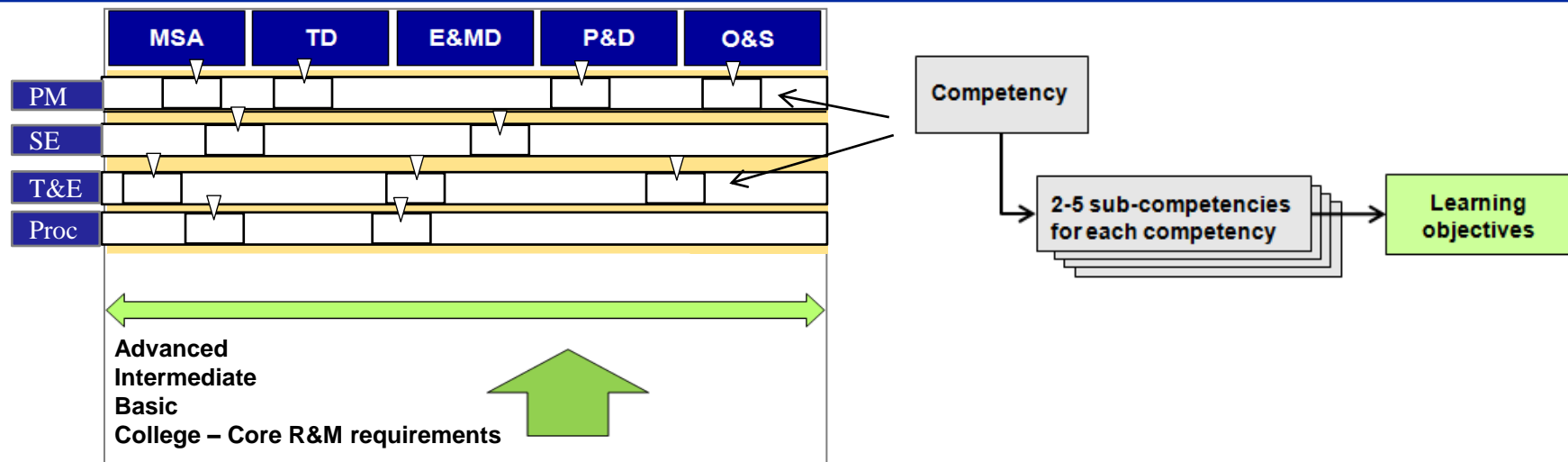


- **Goal:** Adequate numbers of trained R&M Engineering Personnel
- **OSD defines:**
 - Policy
 - DTM 11-003 guidance
 - Workforce competencies
- **SE Functional IPT (FIPT) reviews and validates updated workforce competency set**
- **Informational meetings with other FIPT functional leads (PM, Contracts, T&E, Logistics, BCEFM)**
- **DAU provides training material aligned to approved competency set to meet workforce needs**

R&M Workforce Development illustrates training development key products and process owners.



Workforce Development R&M Competencies

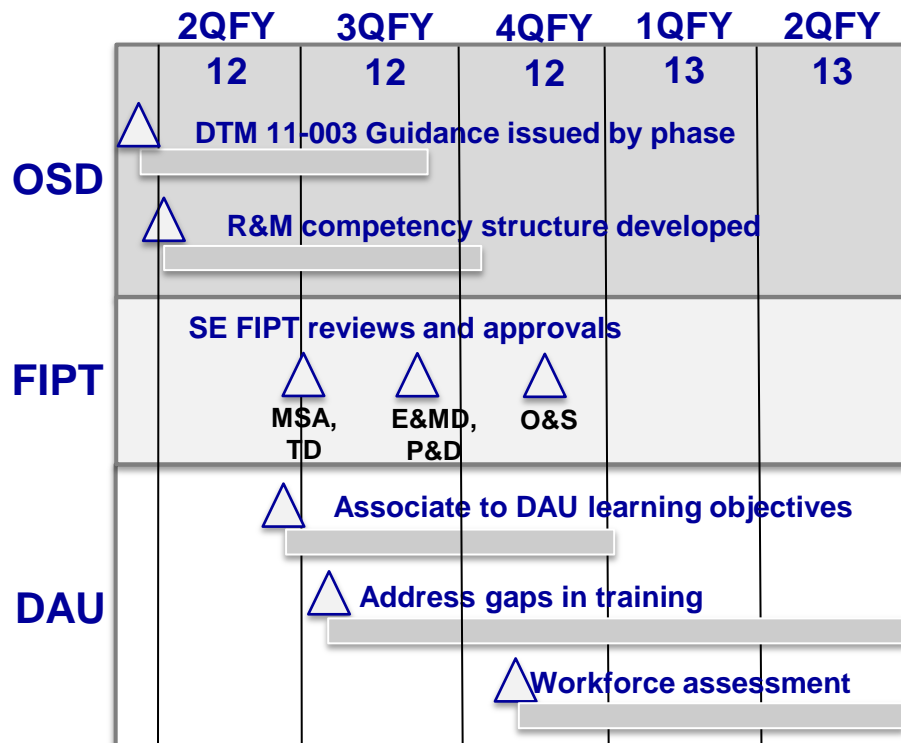


- Competencies are focused by program functional areas and span the acquisition life cycle
- Each competency is decomposed into 2-5 sub-competencies
- Developing Standard Skill Set focused on college, basic, intermediate, and advanced career levels for supplemental information
- Sub-competencies are then mapped to DAU courseware learning objectives
- Opportunities exist to partner with Services and academia to identify core R&M engineering training requirements.

The R&M competency structure spans the acquisition life cycle and will address all levels of proficiency.



Workforce Development SPRDE Competency Update Plan



- Define R&M tasks and competencies from DTM 11-003 Implementation Guidance
- Coordinate workforce development strategy with SPRDE Functional Leadership
- Associate R&M competencies against DAU SPRDE courseware learning objectives
- Identify and address gaps for improvement within the DoD and Academia learning infrastructure
- Develop measures for determining and assessing workforce capability

Schedule approach driven by issuance of DTM 11-003 Guidance.



Summary



- **Services have reviewed and commented on MSA and TD phases competencies**
- **EMD phase and contracting language released to Services for review**
- **DTM Implementation Guidance serves as basis for R&M competency development**
 - Task driven by acquisition phase and program functional areas
- **DTM 11-003 mandates R&M engineering activities in the acquisition process and is driving an update to SPRDE workforce development**